

## **REMARKS/ARGUMENTS**

The response to the office action is set out at the end of the Remarks section.

In this Response, the Applicant submits that amendments herein are minor and do not add any new matter.

### **Amendments to the Specification**

Paragraphs 21, 23 and 30 are being amended to reflect the correct scope of the claims. For similar reasons, claim 29 is being deleted.

### **Amendments to the Claims**

Claims 1-10 have been previously cancelled, the remaining claims in the application are claims 11-20. These claims 11-20 stand rejected under the judicially created doctrine of obviousness-double patenting, as being unpatentable over claims 1 and 4-10 of U.S. Patent No. 6,761,991. The Examiner has argued that, although the conflicting claims are not identical, they are not patentably distinct as they have the same subject matter.

### **Detailed Comparison of Claims of the Present Application and of U.S. Patent 6,761,991**

The Examiner provided a detailed comparison of the claims of the Frisch '991 patent and the present claims. Without making any concession as to the correctness of the Examiner's analysis, it is submitted that a detailed claim by claim analysis is not necessary in view of the amendments to claim 1 and arguments set out below.

### **Amendments to Claim 1**

The Examiner had argued that the claims as previously worded did not require injecting the sealing material into a completely enclosed groove to form the necessary seals

between adjacent plate. To clarify this aspect of the claim is being amended to specify that the electrochemical cell assembly comprises a plurality of separate elements. Additionally the end of the claim, it is now specified that portions of the groove network within the electrochemical cell assembly are defined solely by the elements of the electrochemical cell assembly. The method is then further specified to comprise curing the sealing material to form a seal including a seal between the least two adjacent elements of the electrochemical cell assembly that define a chamber for fluid operation of the electrochemical cell assembly.

### **Response to Obviousness Argument**

The Examiner has first made the bald and unsupported allegation that the "sole method of injecting a sealant into a groove of bipolar plates is well known in the art". This application and a related applications have been examined in the United States Patent and Trademark Office and elsewhere, with relevant earlier documents being submitted to the United States Patent and Trademark Office to comply with disclosure requirements, and it is submitted that there is no earlier proposal for such a technique.

The Examiner cited that Schilling et al. U.S. Patent '492 and argued that it teaches injecting sealing material in grooves of bipolar plates. What this patent teaches is a different and an entirely conventional technique. Indeed, the seal structure taught in Schilling et al. is such that it necessarily could not be formed by the technique of the present invention. The passage cited by the Examiner at column 3, lines 40-50 describes the basic structure and specifies that grooves 9 are formed during production of graphite plates 2 and 3. It then states "sealing elements 10 are injected". Further, it specifies that "using an appropriate tool", the injection process is carried out in such a way that free gaps 13 are present between side walls 11 of sealing elements 10 and adjacent lateral groove walls 12. This is a clear teaching that the seals 10, for example as shown in Figure 1, must be formed with the aid of a complementary mold part that defines the exposed surfaces of the seal and the gaps 13.

In contrast, the present invention provides a groove network, at least part of which is defined solely by the elements of the electrochemical cell or fuel cell stack itself, without requiring any separate molding elements. This groove network is entirely filled with a sealing material, so that there is nothing comparable to gaps 13 taught in Schilling et al. One of the advantages of the present invention is that it enables tolerances in groove dimensions to be accommodated. Schilling, on the other hand, uses the conventional technique of providing a projecting seal which will be elastically deformed and compressed and for this reason provides the gaps 13 to accommodate sideways expansion of the seals 10 as these are compressed in use.

As claim 1 now clearly specifies this aspect of the invention, requiring at least portions of the groove network to be defined solely by elements of the electrochemical cell assembly (recognizing, as in Figure 3 of the present application, an external seal can be part of the whole seal structure). Further, the method is specified to comprise curing the seal material to form a seal, including a seal between at least two adjacent elements so as to define a chamber for fluid operation of the assembly, etc. Again, with a reference to Schilling et al., since the seals must be formed separately from the stack as a whole, these seals must be formed on each plate prior to assembly, and there is no teaching or suggestion that these seals could be formed, in situ, between adjacent plates in this manner. Indeed, the requirement for the gaps 13 would prohibit any such technique.

Accordingly, it is submitted that claim 11 is patentably distinct from the Frisch et al. U.S. patent 6,761,991. With respect to the dependant claims 12-20, it is submitted that these are also patentably distinct both being dependant from an allowable claim 1 and also for introducing further patentable features, so that detailed analysis and rebuttal of the arguments made by the Examiner are not required.

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Early review of this matter is requested at this time.

If the Examiner has any questions with regards to the amendments made herein, the Examiner is respectfully requested to contact the undersigned.

Respectfully submitted,

**FRANK et al.**

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